

**CLAIMS:**

1. A ventilator for supplying breathable gas to a patient, comprising:
  - 5 an external housing;
  - an internal housing suspended within said external housing;
  - a gas flow generator located within said internal housing for creating a gas flow to the patient;
  - 10 a gas inlet conduit extending between a first gas inlet opening in said external housing and a second gas inlet opening in said internal housing, and
  - 15 a gas outlet conduit extending from a first gas outlet opening in the internal housing via a second gas outlet opening in the external housing and to a patient interface means adapted for introducing the breathable gas into the airway of said patient, wherein one or both of the gas inlet conduit and the gas outlet conduit exhibits:
    - a first substantially rigid conduit section, and
    - 20 a second membrane conduit section, with a membrane wall portion separating a volume of breathable gas within the gas inlet conduit and/or gas outlet conduit from a volume of ambient air within the external housing.
2. The ventilator according to claim 1, wherein said membrane conduit section is formed with at least one flexible wall portion and as a chamber, said chamber comprising a structural frame element which delimits said at least one flexible membrane wall portion.
- 25 3. The ventilator according to claim 2, wherein said chamber is arranged on an exterior face of the internal housing, said exterior face defining an inner wall section of the chamber.
- 30 4. The ventilator according to claim 3, wherein a sound absorbent layer is provided within said chamber on said exterior face.
- 35 5. The ventilator according to claim 2, wherein said structural frame element comprises a grid with multiple grid apertures, said flexible membrane wall portion being formed by a single membrane sheet which is attached to the grid at least along an outer periphery of the structural frame element and covers said multiple grid apertures.

6. The ventilator according to claim 5, wherein said grid apertures are substantially rectangular.

7. The ventilator according to claim 1, wherein said chamber is provided with a 5 plurality of sound deflection barriers located between an entrance opening to the chamber and second inlet opening to the internal housing, said sound deflection barriers being arranged so as to at least partially block direct sound propagation between said entrance opening and said second inlet opening.

10 8. The ventilator according to claim 1, wherein a flexible vibration-isolating conduit section is arranged between the rigid conduit section and the membrane conduit section.

15 9. The ventilator according to claim 1, wherein said membrane conduit section is formed as a flexible tube section having a generally polyhedral cross-section, said flexible membrane wall portion being defined by the wall of said tube section.

10. The ventilator according to claim 9, wherein said flexible tube section is made of silicone rubber.

20 11. The ventilator according to claim 1, wherein said first substantially rigid conduit section extends along the outline periphery of the external housing.

25 12. The ventilator according to claim 11, wherein the rigid conduit section is substantially L-shaped.

13. The ventilator according to claim 12, wherein the external housing is manufactured by molding, wherein the rigid conduit section is integrally formed with the external housing, and extends along the inside of an outer wall of said external 30 housing.

14. The ventilator according to claim 13, wherein the rigid conduit section is partially integrated in a hollow lift handle portion formed in the external housing, the first gas inlet opening being located in said lift handle portion.

35 15. The ventilator according to claim 11, wherein the external housing is manufactured by molding, wherein the rigid conduit section is integrally formed with

the external housing, and extends along the inside of an outer wall of said external housing.

16. The ventilator according to claim 15, wherein the rigid conduit section is  
5 partially integrated in a hollow lift handle portion formed in the external housing, the  
first gas inlet opening being located in said lift handle portion.

17. The ventilator according to claim 1, wherein said internal housing is  
suspended in said external housing by means of one or more vibration isolator  
10 elements.

18. The ventilator according to claim 1, wherein:

    said gas flow generator is located in a sub housing within the internal  
    housing, and

15      a tortuous path, provided with a sound absorbing lining, is defined between  
    the internal housing and said sub housing, said tortuous path extending between the  
    second gas inlet opening in the internal housing and a third gas inlet opening in the  
    sub housing.

20 19. The ventilator according to claim 18, wherein said tortuous path is formed by  
    successively arranged, and mutually displaced projecting barrier walls, wherein said  
    sound absorbing lining is formed as at least one undulating plastic foam insert  
    provided with slots for receiving said barrier walls.

25 20. The ventilator according to claim 1, wherein:  
    said gas flow generator is located in a sub housing within the internal  
    housing, and

    a tortuous path, provided with successively arranged sound absorbing  
    elements, is defined between the internal housing and said sub housing,

30      said sound absorbing elements being constituted by perforated metal plates  
    coated with sound absorbing material on one or both sides thereof, said metal plates  
    being of a uniform size and shape, and angled relative to a general direction of the  
    tortuous path, and

    said tortuous path extending between the second gas inlet opening in the  
35 internal housing and a third gas inlet opening in the sub housing.

21. The ventilator according to claim 1, wherein said membrane wall portion is  
made of a thin plastic film.

22. A noise reduction method for a ventilator for supplying breathable gas to a patient, the ventilator comprising:

- an external housing;
- an internal housing suspended within said external housing;

5 a gas flow generator located within said internal housing for creating a gas flow to the patient;

- a gas inlet conduit extending between a first gas inlet opening in said external housing and a second gas inlet opening in said internal housing, and
- 10 a gas outlet conduit extending from a first gas outlet opening in the internal housing via a second gas outlet opening in the external housing and to a patient interface means adapted for introducing the breathable gas into the airway of said patient, wherein
- 15 a volume of breathable gas within the gas inlet conduit and/or gas outlet conduit is separated from a volume of ambient air within the external housing, whilst allowing acoustic energy transfer between said volumes by means of one or both of the gas inlet conduit and the gas outlet conduit exhibiting:
- 20 a first substantially rigid conduit section, and
- a second membrane conduit section having at least one flexible membrane wall portion, said membrane wall portion allowing said acoustic energy transfer between said volumes.

23. A ventilator for supplying breathable gas to a patient, comprising:

- an external housing;
- an internal housing suspended within said external housing;

25 a gas flow generator located within said internal housing for creating a gas flow to the patient;

- a gas inlet conduit extending between a first gas inlet opening in said external housing and a second gas inlet opening in said internal housing, and
- 30 a gas outlet conduit extending from a first gas outlet opening in the internal housing via a second gas outlet opening in the external housing and to a patient interface means adapted for introducing the breathable gas into the airway of said patient, wherein one or both of the gas inlet conduit and the gas outlet conduit exhibits:
- 35 a first substantially rigid conduit section, and
- a second membrane conduit section, having at least one flexible membrane wall portion separating a volume of breathable gas within the gas inlet conduit and/or gas outlet conduit from a volume of ambient air within the external housing, whilst allowing acoustic energy transfer between said volumes.